

Accident Alert System using Advance Microcontroller

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ABSTRACT

In India most of the accidents are happening due to vehicles over speeding. Sometimes if obstacle is close to the vehicle then they won't be able to judge the distance to apply instant brakes and accident is occurred. To avoid accident due to over speeding, obstacle detection using ultrasonic sensors is used. In this project ultrasonic sensor is used for 360degree detection of obstacle. If obstacle is in front of the vehicle less than safety distance, automatically brakes will be applied or if vehicle comes from backside of the vehicle and is at less than safety distance then the warning light is shown to vehicle. Sometimes if vehicle is coming very close to our vehicle just before hit the vehicle the airbags are open.

KEYWORDS: Ultrasonic sensor, Collision sensor, braking system, warning system, airbag system

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I. INTRODUCTION

The vehicle accident could be a part of disaster that might occur anywhere anytime. About 1.2-1.5 million individuals die on the world's roads annually, creating it a number one reason for death globally. Speedy economic process has magnified motorization and road traffic injuries. Their square measures only a few road safety measures in developing countries, so resulting in additional road disasters. Some countries that have with success enforced these solutions have knowledgeable about considerable reductions in the road accident deaths. This technique is suggested wherever common faults by the drivers square measure eradicated, with several of the intelligent vehicles have watching systems solely, like speed sensors, anti-lock brakes, warning system and alternative automatic systems gift, particularly in luxury cars, however, these cars aren't low cost to everybody and so, a value effective however economic system is needed for the security of each automotive user. This a system product of sensors placed within an automotive to caution its driver of any obstruction that might presumably lie ahead on the road. A number of the risks detected by these sensors embrace the proximity of the automotive to alternative cars around it, and its precise distance from the cars. The supersonic sensing element is changed to live the proximity with regard to the previous automotive for the stern. The most gettable supersonic sensors for vehicles square measure approved for approaching cars with relatively low speed. Whereas the rough reading of proximity information cannot be applied directly, associate intelligent technique is projected to method the gap scan out of sensors to yield appropriate cautioning signals and counter measures.

Approaches to automobile crash shunning systems are supported dominant the steering maneuverings system and on automotive warning systems that interfere with the vehicle drivers to activate braking systems. Several of these systems are terribly expensive and build it terribly expensive for middle financial gain earners to possess such vehicles. Additionally, these approaches don't take into thought the security distance to stoppage of the car.

This invariably provides a space for human error. Thus, this paper presents the event of associate automatic small controller-based crash shunning system that is used obstacle detection and distance mensuration victimization supersonic sensors to find obstacles, and their distances for automatic safety braking. Automotive while not the driver's consent and inside the safest distance between the vehicles, and also the obstacle.

The warning system is for alternative vehicles square measure comes terribly shut or but safety distance to our vehicle then red light and sound is made. If vehicle comes in no time towards our vehicle and distance terribly less then air baggage square measure opens that aspect of car thanks to these damages of our vehicle is a smaller amount as compared to alternative. This technique is simply backup system for emergency purpose.

II. PREVIOUS WORK RELATED

The collision avoidance system is an automobile safety system designed to reduce imminent and the possibility of an

accident. These systems have evolved over time from the dumb systems to current intelligent systems operational and beneath analysis. They use electronic circuitry coupled with distance sensors and sometimes camera sensors to detect an imminent crash. Once the detection is finished, these systems either offer a warning to the driving force once there's associate degree close at hand collision or take action autonomously with none driver input by automatic application of brake.

The work in uses radar detector which sends out quick bursts of high-frequency radar waves. These waves will bounce off the nearest objects and return to the sensor, where it calculates the distance, speed and relative velocity almost immediately. The system is restricted to the use of visual warning only to alert the driver.

In, the approach employs elementary robotics, digital imaging, image processing, and artificial intelligence to accomplish its operational activities, such as steering, speed control circuits and collision detection system. The system is available only for gear-less two-wheelers only and the tracking mechanism involves painting two white strips along the length of the road where it moves.

In the system detects objects or obstacles using sonar sensors which produces the sound waves and receives the waves reflected from the obstacle, including avoidance algorithms as Basic reflexive collision avoidance system. The system's limitation as shown in the implementation is the sensor integrity. Also, given the approach that's enforced by optical device, that identifies vehicles by victimization optical device rays, by transmission and receiving. The optical device transmitter is connected to the optical device and a Controller space Network (CAN) that connects to any or all sides of the node, and sends the knowledge via Zigbee and transmit the message to the alphanumeric display output on the motive force aspect. The system is restricted to transmission and receiving while not counter-action to avoid collision.

The system in uses a network of sensors to observe the surroundings of a vehicle, therefore, on live the distances to different vehicles and check the potential obstacles. The key problems that have slowed the progress of this field include: package completeness, Vehicle modelling system price and device integrity.

In the system detects objects or vehicles or obstacles using ultrasonic sensors which produces the ultrasonic waves and receive backs from the obstacle, including collision an avoidance system and applied instant brake and create warning sound.

III. SYSTEM DESIGN

1. The following assumptions are made during the system design.

- A vehicle with 4 wheels is considered
- Braking torque is applied on all the 4 wheels
- Vertical, roll and pitch motion are ignored
- The braking dynamics are considered as linear first-order system
- Effect of the suspension on the tire axles is discounted.

2. The following parameters are also considered during the design of the vehicle model.

- Lateral velocity (speed) of the vehicle, v m/s

- Angular velocity of the wheels, ω rad/
- Mass of the vehicle M kg
- Radius of the wheel, R m.

The system uses a associate supersonic module interfaced to the Microcontroller board. Associate supersonic electrical device consisting of a transmitter and receiver is employed for the project. Controller sends a trigger pulse to the supersonic sensing element that then transmits supersonic waves. The transmitted waves are mirrored back from the item & received by the electrical device once more. Supersonic sensing element sends echo pulse to the controller. The supersonic sensing element converts the sound signal to electrical signal that is processed in Microcontroller to live distance.

The whole time taken from causing the waves to receiving it's calculated by taking into thought the rate of sound. Then the space is calculated by a program running on the Microcontroller. The measured distance may be used as management, an impact, an impression, an effect, a bearing, a sway parameter by the user to come up with associate audio-visual warning similarly on trigger automatic control outputs for speed and automatic brakes betting on the edge parameters set consistent with the package program.

The ultrasonic sensors work around 360-degree angle of vehicle. The system detects vehicles which comes very fast and near to vehicle using the ultrasonic sensor which produces the ultrasonic waves and receive backs from the vehicle, including collision avoidance system and before impact of other vehicle around few seconds airbags will open at that side of vehicle due this impact effect decreases. The total time taken from causing the waves to receiving it's calculated by taking into thought the speed of sound.

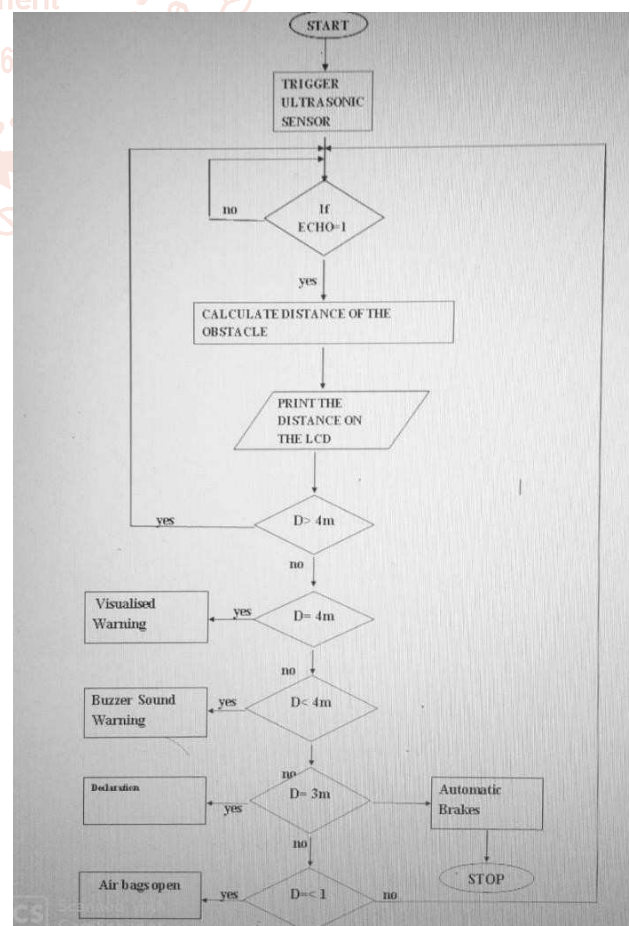


FIG.FLOWCHART OF SYSTEM

Then the space is calculated by a program running on the Microcontroller. The general block diagram comprises Power supply unit (a DC battery which can supply up to 12v and the circuit takes up 7-12V and supplies 5V DC to the Microcontroller), sensors, and other Output devices, range sensing unit (forward and reverse ultrasonic range sensors) for distance measurement, warning unit — consisting of Buzzer, LCD and LED display to provide warning signals to driver of vehicle or road users and braking unit for braking purpose, airbag system for safety purpose.

IV. DESCRIPTION OF UNIT

1. **The Power Supply Unit:** The power supply system designed in this research supplies the desired voltages to the micro-controller and the buzzer, LCD and LED's. The system operates at a voltage of 5V DC. Therefore, from a voltage source of (7-12V) DC, a voltage regulator is used to give stable 5 volts DC, however, the regulated output usually varies between 4.8-5.2V.
2. **Range Detecting Unit:** The distance detection mechanism is made up of range ultrasonic sensors. The HCSR04 ultrasonic sensor modules are used in this research. The range sensor uses sonar to determine distance. It is stated that SR04 ultrasonic sensor modules are used in this research. The range sensor uses sonar to determine distance. It is stated that HC-SR04 offers a superb vary accuracy Associate in the nursing stable readings in an easy-to-use package

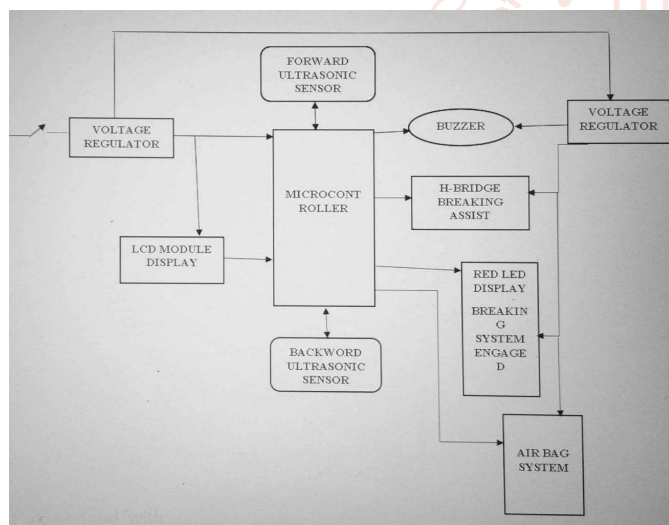


Fig- BLOCK DIAGRAM OF SYSTEM

Wire connection for the ultrasonic device modules is represented as:

- VCC is connected to 5V offer.
- Trig, that is Trigger Pulse Input is connected to Microcontroller digital input/output pin.
- Echo that is Echo Pulse Output is connected to Microcontroller digital input/output pin.
- GND is connected to 0V Ground.

3. **Warning Unit:** This subsystem provides reliable warning to drivers about a possible collision prior to their reaching an unsafe position or location. The composition of the warning system consists of the buzzer, LED and LCD. The mode of operation of the warning system is, a red LED will light upon detecting an object, if the object is 3 meters away while being displayed on the LCD, the buzzer starts buzzing, when the object is 2 meters close

to the automobile the precautionary braking system to avoid collision is engaged.

4. Airbag unit is for safety purpose if vehicle is come very fast and less than or equal to 1 m of our vehicle before collision it will activate.
5. H-bridge: Is associate degree electronic circuit that allows voltage to be applied across a load in either direction, wherever his usually utilized in numerous applications to permit DC motors to run in forward and backward direction.

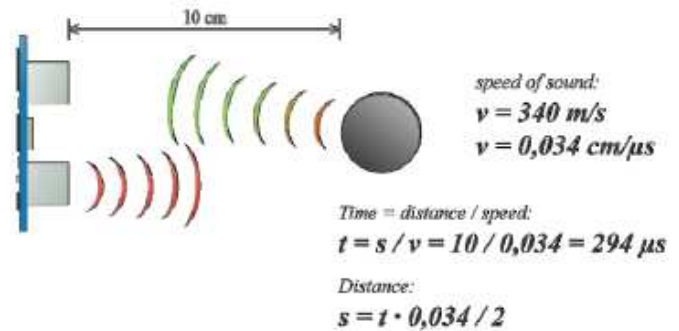


Fig -HC-SR04 SENSOR FUNCTION

Features:

- Power Supply: +5V DC
- Working Current: 15mA
- Effectual Angle: <15degree
- Ranging Distance: 2cm – 400cm/1"– 13ft
- Resolution: 0.3cm Measuring Angle: 30 degree Input pulse width: 10Us

Varieties of sensors area unit on the market which may be used for the detection of obstacles. Some prevalent sensors are: Infrared sensors (IR), Ultrasonic sensors, Cameras, which can be used as a part of Computer Vision, Sonar. It will live the gap in its field of read of regarding thousands to bunch points within the style of automaton, we tend to area unit using ultrasonic sensors for obstacle detection and dodging.

The ultrasonic device consists of a multi-vibrator, that fastened at its base. The multi-vibrator is combination of a resonator and vibrator. The inaudible waves generated by the vibration are delivers to the resonator. Ultrasonic device truly consists of two parts: the electrode that produces a 40 kHz sound wave and detector that detects 40 kHz sound waves and sends electrical signal back to the Microcontroller.

Advantages: -

- It is used as a movable closed-circuit television.
- It is controlled remotely.
- It doesn't need Man Power.
- It is used for essential application like flood, bomb disposal, Fire, act of terrorism, Earthquake, Spying.

Drawbacks of Existing System: -

- It is time intense project.
- It is use for brief distance solely.
- It isn't in human management.
- It isn't counselled to stay the vary terribly long as a result of this is able to cause the mechanism to stay moving forward and backwards because it senses obstacle, even far-off from it.

Applications: -

- This mechanism is use for choose and place the need object by giving directions to the mechanism, however IR combine ought to by replace relying upon the appliance.
- By doing further things, it is employed in army application.
- Automatic amendment overs of traffic signals.
- Intruder alarm.
- Counting instruments access switches parking meters. Back navigational instrument of vehicles.

Scope: -

- Work for associate extended amount of your time while not intervention from human or a necessity for power offer.
- Avoid things that area unit harmful.
- The designed mobile mechanism is ready to avoid obstacle utterly like programmed.
- If the present project is interfaced with a camera mechanism is driven on the far sideline of sight become much unlimited as networks have terribly massive vary.
- By adding temperature detector, storage tank and creating some amendment in programming we are able to use this mechanism as fireplace fighting mechanism.

V. CONCLUSION

The development of automobile collision avoidance, by implementing an ultrasonic sensor-based collision avoidance system is presented. The objective was to reduce collisions to reduce death of persons, death of wildlife, automobile damages and damages to property upon collision, and thus eliminate the related costs. For the system to perform this desired function, it was implemented as an automatic system, based on Microcontroller. The implemented system was ready to confirm the separation distances between automobile and obstacle suitably, offers warning by suggests

that of onboard warning systems, and interact braking at minimum separations distance.

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